PATENT ABSTRACTS OF JAPAN

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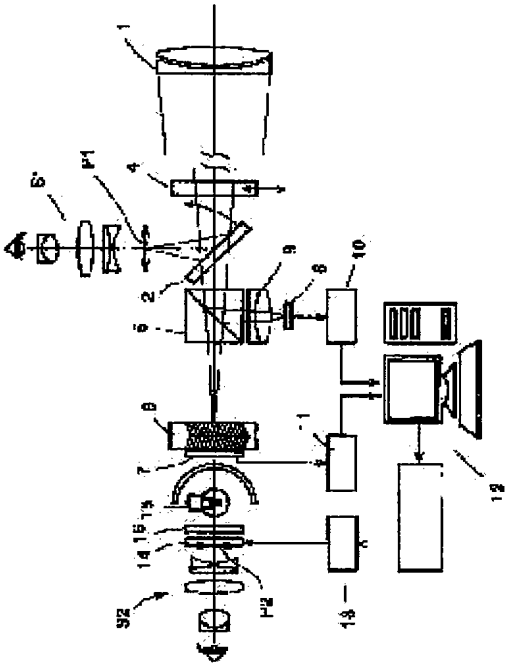
(54) ASTRONOMICAL TELESCOPE

(57)Abstract:
PROBLEM TO BE SOLVED: To realize an astronomical telescope which supplements the visual recognition of an observer and does not overburden an observation posture.
SOLUTION: The light from an objective optical system 1 caught by imaging devices 7 and 8 is converted to an electric signal from which the digitalized image data is obtained. This image data is captured into a computer 12 and is subjected to image processing. The processed images are displayed on a display 14 in real time and the displayed images are observed in an eyepiece section S2.



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[What is claimed is]

[Claim 1]

An astronomical telescope, wherein light from an objective optical system captured by an image pick-up device is turned into a digitized image data by being converted into an electric signal, and concurrently, this image data is input into a computer to undergo image processing, and a processed image is displayed on a display in real time, and a displayed image is caused to appear on an eyepiece member.

[Claim 2]

The astronomical telescope set forth in claim 1, wherein image processing to be executed on an image data is for the purpose of improving a visibility of some deep-sky objects to an observer.

[Claim 3]

The astronomical telescope set forth in claim 1 or 2 comprising:

an image pick-up device of capturing light from an objective optical system; and

an eyepiece member of observing an image formed by an objective optical system, wherein capturing the light from the objective optical system or observing the image formed by the objective optical system is selectable by switching over the optical path.

[0007]

[Preferred example embodiments]

Referring to accompanying diagrams, specific example embodiments of an astromical telescope of the present invention will be described below. Fig. 1 is a diagram showing an example of the present invention, and of course, a type of the telescope is not limited to a refractive telescope although the refractive telescope with a relative small aperture is exemplified here as a typical example. This telescope of the example embodiment is provided with two eyepiece members, that is, usual first eyepiece member S1 forming and observing light from an objective

optical system on image forming plane P1, and second eyepiece member S2 displaying an image on display 14, which is unique to the present invention. In Fig. 2, reference code 1 indicates an objective lens constituting the objective optical system, and light from the objective lens is bent by movable mirror 2 inserted along the optical path at 45 degrees and is formed on image forming plane P1, and is observed by first eyepiece member S1, and here, an observer observes some deep-sky object images prior to image processing.
In fact, reference code 4 in the diagram is a known light pollution filter which is inserted into the objective optical path as needed.

[0008]

When movable mirror 2 is retracted from the optical path, the light from the objective optical system advances toward an image pick-up device, and according to the present example, there are arranged two image pick-up devices, and thus, the light is split into two directions by beam splitter 5. At first, the light directly transmitting within beam splitter 5 arrives at an image inputting plane of image intensifier device (image intensifier tube) 6, and forms an image hereon. On the image inputting plane of image intensifier device 6, there is optically integrated CCD 7, which is a first image pick-up device, and a light intensified image is created hereon. An object of this CCD 7 is to obtain brightness information from the image, and thus CCD having a high resolution is employed. On the other hand, the light split into a direction perpendicular to the optical path by beam splitter 5 arrives at color CCD 8, which is a second image pick-up device, and forms the image hereon. An object of this CCD 8 is to obtain color information from the image. Thus, CCD having a low resolution but a quite high sensitivity is employed. In fact, there is a case where CCD 7 and CCD 8 are different in a size of a picture element size, and thus, for correction of this difference, magnifying or reduction lens 9 is placed somewhere in front of color CCD 8.